

Embedded Linux Conference

Closing Games

Tim Bird

Core Embedded Linux Project

Linux Foundation

A little pre-fetching...

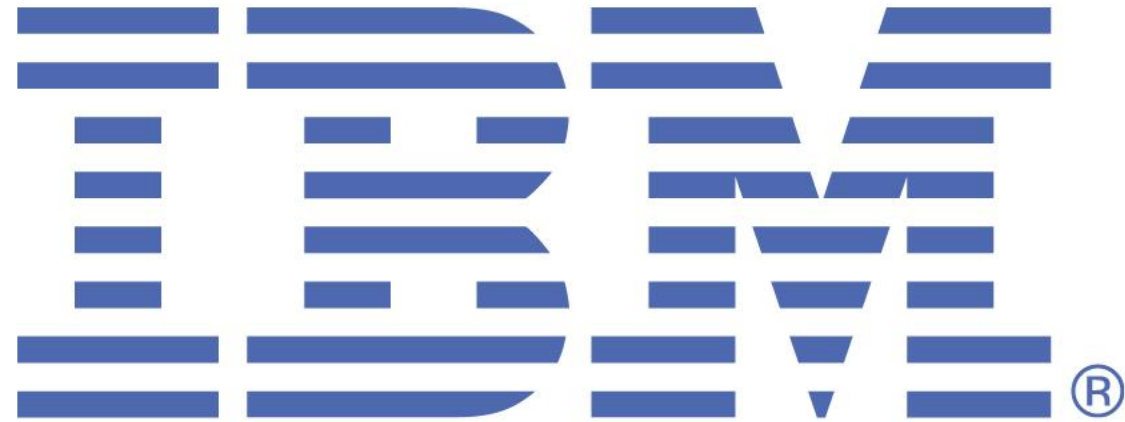
- Find your event confirmation number
 - Should be in your registration confirmation email
- I'll keep talking while you look

Thanks are due...

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- Program committee

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- Attendees

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- Sponsors
- Program committee
- Speakers
- Attendees
- Linux Foundation Event Staff

Game registration

- Get required information:
 - Find your event confirmation number
 - Should be in your registration confirmation email
 - Decide on an account name (user alias)
 - Also need your real name and an email address
 - This will only be used if you win a prize
- Please open <https://closinggame.net/>
 - Click on “The Red-Green Game”
 - Register your account
 - Wait on the “waiting” page until I tell you to proceed

Some Housekeeping

- Speakers – please submit PDF to sched.com site
 - Use “Manage session” on your session page
 - Don’t make us hunt you down!
- Sessions were recorded
 - Will be put on YouTube eventually

elinux Presentations Page

- elinux.org Presentation page is already available:
[https://elinux.org/ELC Europe 2020 Presentations](https://elinux.org/ELC_Europe_2020_Presentations)
- Special Announcement this year about talks
- Project to categorize previous year's talks by topic area
 - Developers at Path Partner have worked hard on this

Categorized Presentations

- Pages are sorted into categories

- Is a work in progress

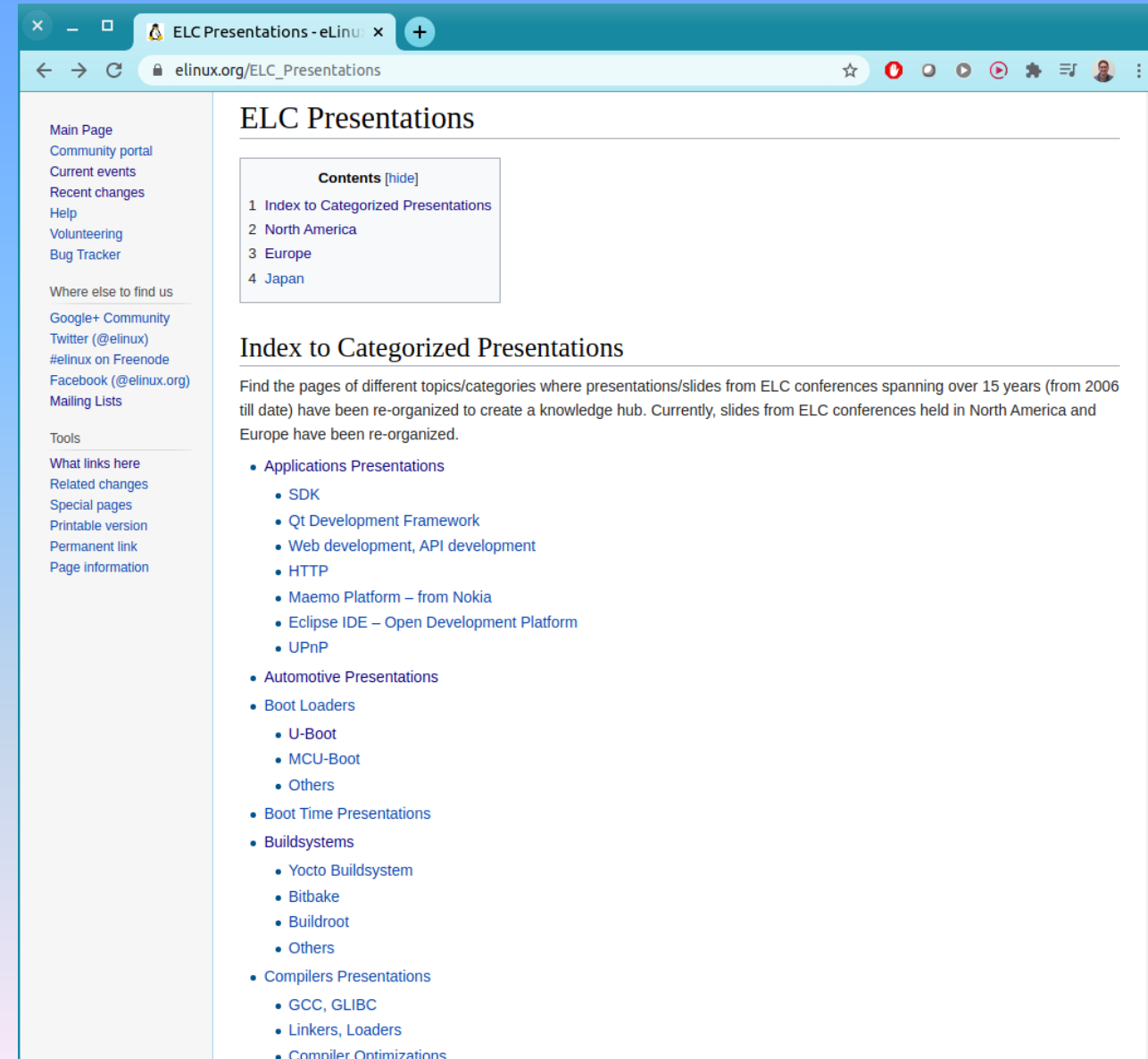
- https://elinux.org/ELC_Presentations

- Please feel free to edit

- But keep ordering

- Latest talks on top

- Please add your talk to the appropriate page/category



Future events

- Embedded Linux Conference 2021
 - August 4-6, Vancouver, Canada
- Embedded Linux Conference Europe 2021
 - September 29-October 1, Dublin, Ireland (take two)
- Definitely want to have in-face events again!
 - Will keep some virtual elements – some have been really positive



We're going to play some games

- I like games where everyone has a chance to win
- Types:
 - Skill
 - Luck
- Basic outline:
 - We narrow the contestants down
 - The winners will be selected and will be contacted to provide a prize

How to play

- Normally we play this in person...
- Big overview:
 - Register online
 - Answer questions
 - (Hopefully) Win prizes

Probability of Success: Low

- This uses a homebrew, hand-written web script
 - Plenty of time to rigorously test it, but didn't dust it off until Monday
- Have some new features which have not been tested under load.
- Let's see what happens, shall we?

What is at stake?

- Prizes
 - LWN.net certificates
 - Gift cards!!



Our First Game

- Embedded Linux History, Technical and Nerd Trivia

Our First Game

- Embedded Linux History, Technical and Nerd Trivia

Important Disclaimer: This game is NOT fair.

Our First Game

- Embedded Linux History, Technical and Nerd Trivia

Important Disclaimer: This game is NOT fair.

If, for some reason, you can't register, or the game stops working, I apologize in advance. You can just play along at home.

- If it stops refreshing automatically, please click the link at the bottom to refresh your page.
- The game has no scoring, so you might want to grab a paper and pencil and keep track of how well you did. Give yourself 1 point for each right answer.

Question 1

Warmup question: What is the latest official Linux kernel?

- Green = v5.9.3
- Red = v5.10-rc1

Answer

- Red = v5.10-rc1

The latest official kernel available is the latest release candidate from Linus Torvalds.

Release candidates aren't "released kernels", but they are official.

Besides – the current release kernel is 5.9.1, not 5.9.4

Question

Microsoft has begun shipping the Linux kernel to many of their Windows customers.

- Green = True
- Red = False



Microsoft

Answer

- Green = True

Microsoft's Windows Subsystem for Linux (WSL) version 2 includes a “real” Linux kernel, and can be used to run Linux apps on Windows 10.

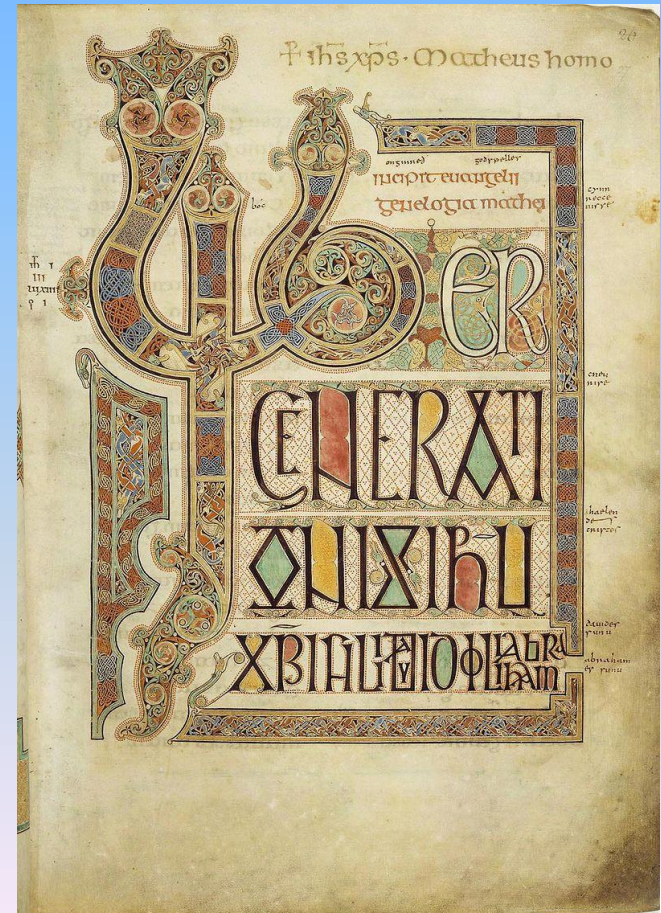
Source:

<https://www.howtogeek.com/424886/windows-10s-linux-kernel-is-now-available/>

Question

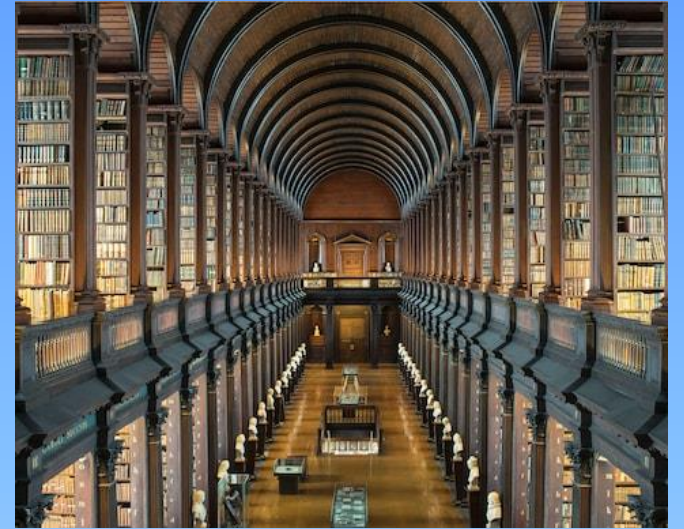
The famous Book of Kells is an “Illuminated Manuscript” created in the 9th century. Where can you view it today?

- Green = Abbey of Kells
- Red = Trinity College Library
- Red and Green = National Museum of Ireland



Answer

- Red = Trinity College Library



The Book of Kells is famous for its elaborate artwork, and is considered one of Ireland's greatest cultural treasures.

Source:

<https://www.tcd.ie/visitors/book-of-kells/>

Question

There has been work recently to remove what obnoxious code pattern from the Linux kernel?

- Green = comma separated statements (e.g. *a=1,b=2;*)
- Red = variable length arrays (e.g. *u8 s[bsize * 2];*)

Answer

- Green = comma separated statements (e.g. a=1,b=2;)

In August 2020, some coccinelle scripts were written to find examples of these, and a set of patches produced to try to eliminate these from the kernel. For the record, VLAs were eliminated in 2018 (making them old news)

- Sources: <https://lore.kernel.org/lkml/alpine.DEB.2.22.394.2008201856110.2524@hadrien/>
- https://www.phoronix.com/scan.php?page=news_item&px=Linux-Kills-The-VLA

Question

What noted science fiction author created the 3 laws of robotics?

- Green = Arthur C. Clark
- Red = Isaac Asimov
- Red and Green = John W. Campbell



Answer

- Red = Isaac Asimov or
- Red and Green = John W. Campbell

Isaac Asimov attributed the Three Laws to John W. Campbell, from a conversation that took place on 23 December, 1940. But I can't in good conscience exclude Asimov from the answer.

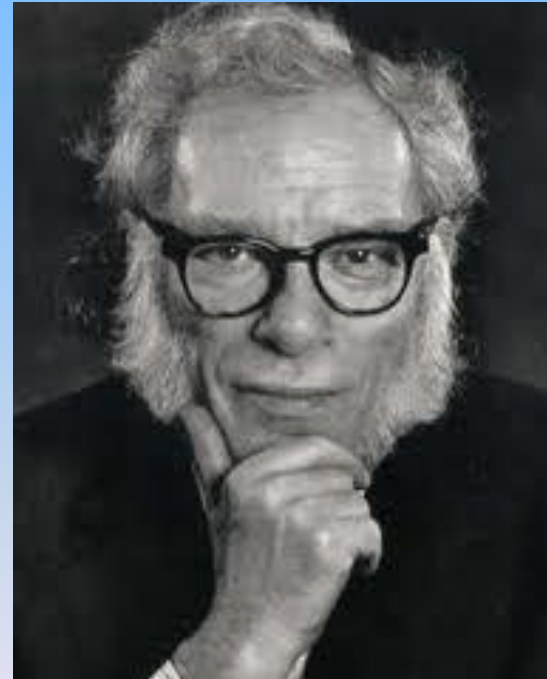
Source:

https://en.wikipedia.org/wiki/Three_Laws_of_Robotics

Question

Isaac Asimov wrote which epic science fiction series of novels?

- Green = Dune
- Red = Foundation



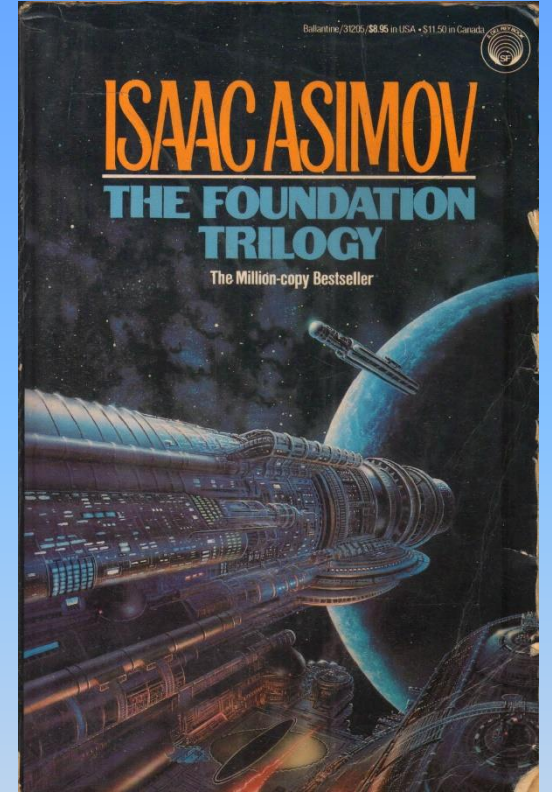
Answer

- Red = Foundation

The Foundation series describes the fall of the galactic empire. Frank Herber wrote Dune. Both series will be available in video form in 2021!

Source:

- [https://en.wikipedia.org/wiki/Foundation_\(TV_series\)](https://en.wikipedia.org/wiki/Foundation_(TV_series))



Note: you can read them now!

Question

The 5.8 kernel consists of 69,325 files and 28442673 lines of code. How many files were in the first release of Linux in 1991?

- Green = 37 files
- Red = 88 files



Answer

- Red = 88 files

The first release of Linux had 88 files.

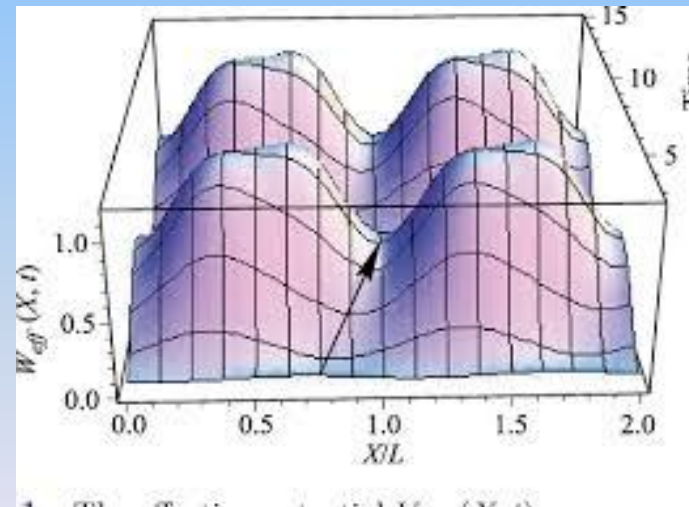
Source: 2020 Kernel History Report:

- https://www.linuxfoundation.org/wp-content/uploads/2020/08/2020_kernel_history_report_082720.pdf

Question

Scientists recently demonstrated a device that harvests usable electricity from “Brownian current” at room temperature, with no moving parts and no heat transfer.

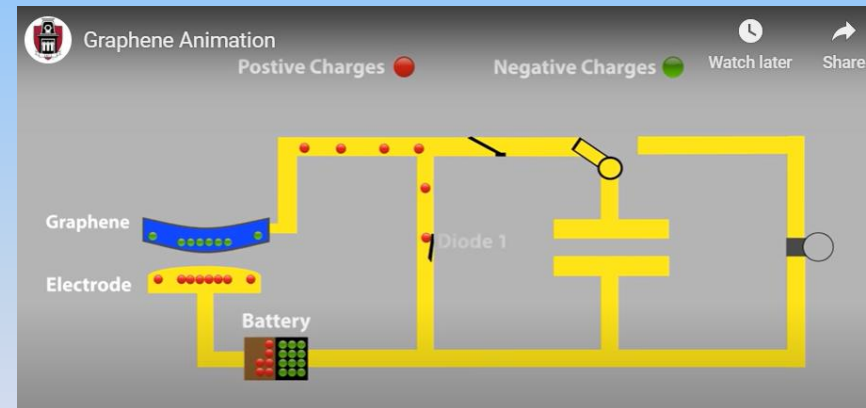
- Green = True
- Red = False



Answer

- Green = true

In a demonstration of “stochastic thermodynamics”, the scientists use one-way diodes and the ripple of Brownian current in graphene to produce an electrical charge capable of putting a load on a resistor.



Source

- <https://phys.org/news/2020-10-physicists-circuit-limitless-power-graphene.html>

What will those crazy scientists think of next!!

Question

How many emails were sent to the Linux Kernel Mailing List (LKML) in 2019?

- Green = more than 400,000
- Red = less than 400,000



Answer

- Red = less than 400,000

There were “only” about 350,000 emails on LKML for the calendar year 2019.

Source: 2020 Kernel History Report:

- https://www.linuxfoundation.org/wp-content/uploads/2020/08/2020_kernel_history_report_082720.pdf

It gives new meaning to the phrase “You’ve got mail!”

Question

What is the official name of the character that “The Mandalorian” protects?

- Green = Baby Yoda
- Red = The Child
- Red and Green = Kuill



Answer

- Red = The Child

Although fans named the character “Baby Yoda”, the child is never referred to by that name in the series.



Source:

- <https://www.starwars.com/news/quiz-how-well-do-you-know-the-mandalorian-season-one>

Parenting can be difficult - especially when the Empire is trying to kill you.

Question

In a computing breakthrough, a group of scientists recently constructed a half-adder computer circuit using only 3 nanowires, rather than transistors. The circuit uses about 1/10th the power of one using electrons.

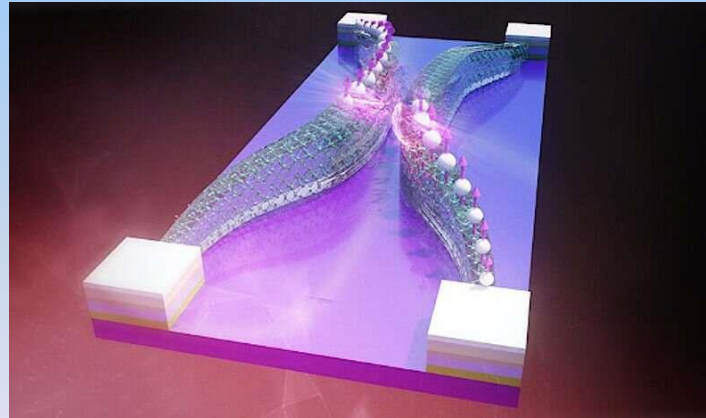
What is the name of the quantum item that the circuit uses to carry signals?

- Green = Phonon
- Red = Magnon

Answer

- Red = Magnon

A magnon is a quasi-particle, and is a quanta of spin-wave. The waves are formed by distortions in the magnetic order of a solid material on the quantum level.



Source:

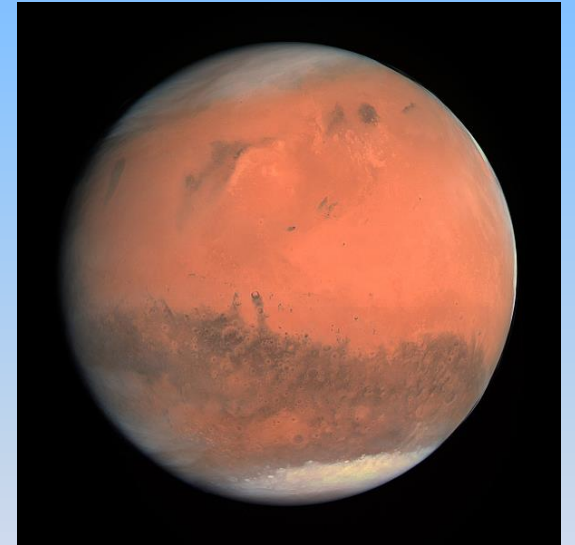
- <https://techxplore.com/news/2020-10-circuit-pure-magnons.html>

You thought I made both those words up.

Question

What is the closest that Linux has gotten to the planet Mars?

- Green = 0 kilometers (on the surface)
- Red = 250 kilometers
- Red and Green = 7.4 million kilometers



Answer



- Red = 250 kilometers

Cubesats running Linux deployed in low Mars orbit in November of 2018. A Tesla car (running Linux?) has an orbit that occasionally gets close to Mars. It recently passed within 8 million kilometers of the planet.

None of the Mars landers have incorporated Linux.



Sources:

- <http://linuxgizmos.com/cubesats-that-confirmed-mars-insight-landing-feature-embedded-linux-com/>
- <https://www.livescience.com/starman-tesla-mars-approach.html>

Question

In 2019, there were over 4,200 contributors to the Linux kernel.
In what year did the number of contributors first surpass 1000?

- Green = 2005
- Red = 2010



Answer

- Green = 2005

The total number of contributors to the Linux kernel since 1991 is over 15,000, with about 4000 developer participating in each individual release

Source: 2020 Kernel History Report:

- https://www.linuxfoundation.org/wp-content/uploads/2020/08/2020_kernel_history_report_082720.pdf

Question

The movie Tenet incorporates elements from which of these ancient puzzle devices?

- Green = the Sator square
- Red = the Scriptum cube
- Red and Green = the Antikythera mechanism



Answer

- Green = the Sator square

All of the words of the Sator square are used in the movie. The square can be read forwards and backwards, which ties in with the theme of the movie.

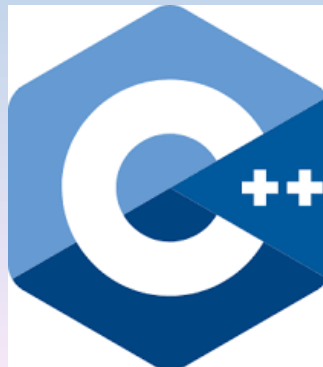


My understanding is that in Europe you can see movies now.

Question

What language, besides C and assembly, has recently been discussed as being possibly supported for kernel development?

- Green = Go
- Red = Rust
- Red and Green = C++



Answer



- Red = Rust

Linus said that kernel developers are looking at having interfaces so that a driver could be written in Rust. The kernel core would continue to only allow C and assembly.

Source

- https://www.theregister.com/2020/06/30/hard_to_find_linux_maintainers_says_torvalds/
- <https://lwn.net/Articles/829858/>

Question

The Civil Infrastructure Platform intends to maintain their Super Long Term Support Linux kernel for how many years?

- Green = 10 years
- Red = 20 years



Answer

- Green = 10 years

The CIP project currently plans 10 years of support. However, there is talk of needing to maintain some kernels deployed in civil infrastructure for up to 50 years.



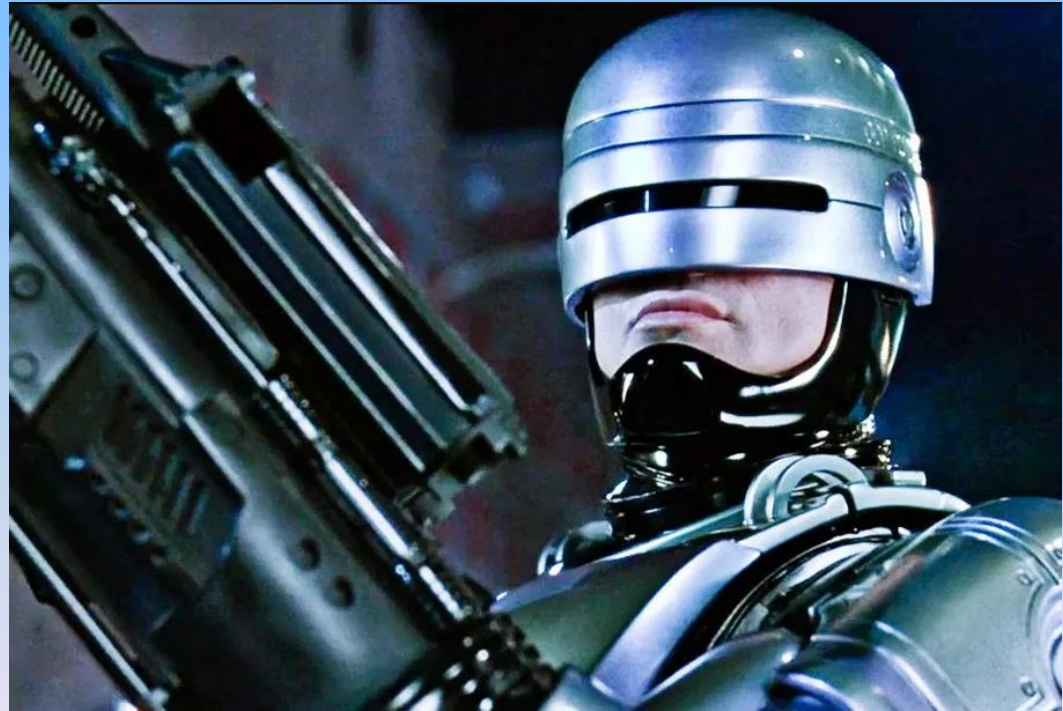
Source:

- https://www.cip-project.org/wp-content/uploads/sites/17/2018/10/CIP_Whitepaper_10.19.18.pdf
- Upstream first is our principle – session at ELCE
 - https://static.sched.com/hosted_files/osseu2020/4e/Oct26_UpstreamFirstIsOurPrincipleTowardSuperLongTermSupport.pdf

Question

The original “RoboCop” used what operating system?

- Green = DOS
- Red = Amiga OS



Answer

- Green = DOS

As can be seen in the 1987 movie, the boot sequence includes “command.com”, “config.sys”, and other DOS-related files.

Source:

This screenshot:



Question

When is the millionth commit expected to be accepted into the Linux kernel?

- Green = before March 2021
- Red = after March 2021



1,000,000

Answer

- Green = before March 2021

It already happened, in August of 2020. This was mentioned in Jim Zemlin's keynote.

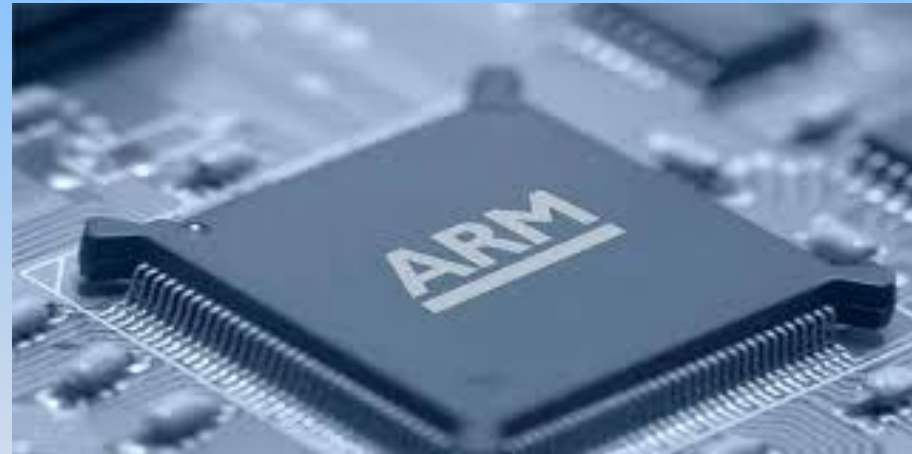
Source:

- <https://www.zdnet.com/article/commit-1-million-the-history-of-the-linux-kernel/>

Question

In September it was announced that ARM Holdings was set to be acquired by what company?

- Green = SoftBank
- Red = NVidia



Answer

- Red = NVidia

Nvidia has offered to acquire ARM Holdings from SoftBank for \$40 billion.

Source

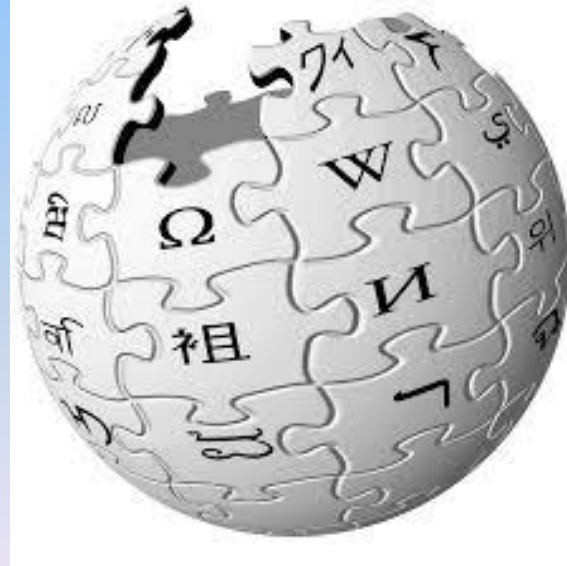
- <https://arstechnica.com/gadgets/2020/09/nvidia-reportedly-to-acquire-arm-holdings-from-softbank-for-40-billion/>

Nobody has ever offered me \$40 billion for anything 😏

Question

After many years of mostly-successful fundraising, in 2020 Wikipedia broke down and accepted government funding, under strict policy that it not interfere with editorial decision-making.

- Green = True
- Red = False



Answer

- Red = False

Wikipedia still does not accept government funding. However, several companies have matching gifts programs that donate substantial support to the Wikimedia foundation. Wikipedia did, however, announce some changes to their page design coming in the near future (before their 20th anniversary in 2021).

Source

- <https://diff.wikimedia.org/2020/09/23/wikipedia-is-getting-a-new-look-for-the-first-time-in-10-years-heres-why/>

Question

Google has announced a new thing that seems pertinent to our times. Which is it?

- Green = A new device that will automatically record audio and video and notify your emergency contacts, if you are involved in a traffic stop
- Red = A service to stay on hold and alert you when a live operator comes on a telephone call

Answer

- Red = A service to stay on hold and alert you when a live operator comes on a telephone call

Google's service is called "Hold for Me". Amazon is releasing a product called the Ring Dash Cam, which has a "Traffic Stop" feature as described.



Sources:

- <https://www.theverge.com/2020/9/25/21454772/amazon-ring-car-cam-traffic-stop-police-accountability>
- <https://techcrunch.com/2020/09/30/a-new-google-assistant-feature-hold-for-me-waits-on-hold-so-you-dont-have-to/>

Is it just me, or are people getting lazy?

Question

A glasses-free “holographic” display, which uses eye tracking and the Unreal game engine to present a 3-dimensional view to the user, just came on the market.

- Green = True
- Red = False



Answer

- Green = True

The Sony “Spatial Reality Display” costs \$5000, and is targeted at industrial and commercial designer. It does both parallax and occlusion based on eye position, and shows different images for each eye using a lenticular display.



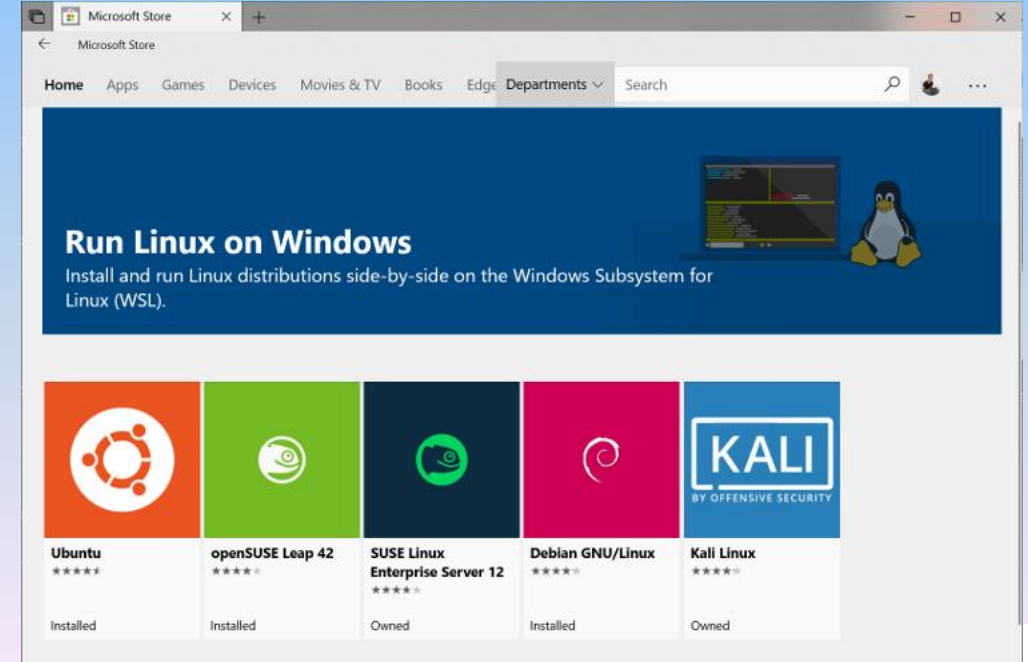
Sources:

- <https://www.theverge.com/circuitbreaker/2020/10/15/21518679/sony-spatial-reality-display-hands-on-holographic-elf-sr1>
- <https://www.engadget.com/sony-spatial-reality-display-3d-glasses-free-010029316.html>

Question

Microsoft has announced plans to allow users to convert their Windows System for Linux into a standalone product capable of running Windows applications. This product would still require a Windows license by the consumer.

- Green = True
- Red = False



Answer

- Red = False

There have recently been stories that Microsoft would base future versions of Windows on Linux, but they are currently just speculation.

Source:

- <https://www.computerworld.com/article/3438856/call-me-crazy-but-windows-11-could-run-on-linux.html>

Question

Which Sith Lord said the words: “I am altering the deal. Pray I don’t alter it any further”?

- Green = Darth Vader
- Red = Darth Sidious



Answer

- Green = Darth Vader

Darth Vader breaks his word to Lando Calrissian about letting Princess Leia and Wookiee stay in cloud city under Lando's supervision.



Do NOT invite this guy to dinner

Question

How old is the Yocto Project?

- Green = 10 years old
- Red = 12 years old



Answer

- Green = 10 years old

The official announcement of the Yocto Project was made at ELC Europe in Cambridge, UK in October of 2010.



Source:

- Tim Bird - I was there
- Also, it was announced in this ELCE's keynote address on Monday

Happy Birthday Yocto!!!

Question

Who has the most code in the linux kernel?

- Green = Linus Torvalds
- Red = Alex Duecher
- Red and Green = Hawking Zhang



Answer

- Red = Alex Duecher

According to cregit for 5.7, it is Alex. Linus said he doesn't do much programming anymore (he's more like a manager), and even these stats for pre-git probably include lots of source from other people.

| Author | Tokens | Percent |
|--------------------------|---------|---------|
| Alex Deucher | 4548031 | 4.20% |
| Linus Torvalds (pre-git) | 3484706 | 3.22% |
| Hawking Zhang | 1326778 | 1.22% |

Source:

<https://cregit.linuxsources.org/code/5.7/>

Linus is such a slacker!

Question

A significant security exploit in the “spectre” family is called what?

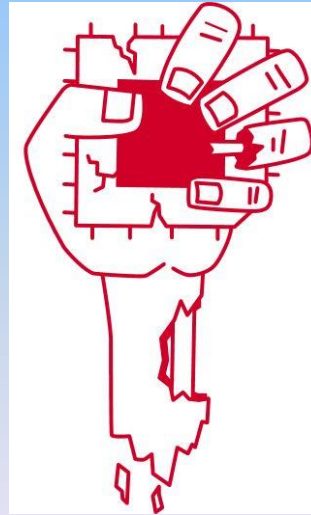
- Green = Zombieland
- Red = Zombieload Attack



Answer

- Red = Zombieload Attack

ZombieLand is a movie



≠



Question

One of the interesting features of the Dublin Convention Center is:

- Green = The facility has breakout rooms can be rotated into the main keynote auditorium
- Red = The conference center was the first carbon-neutral constructed event center in the world



Answer

- Red = The conference center is energy efficient and was the first carbon-neutral constructed event center in the world

The conference center was built with sustainability in mind and is very energy efficient. Low-carbon cement was used during its construction, and carbon offsets were purchased for all unavoidable carbon use.

The conference center in Edinburgh Scotland has rotating breakout rooms.

Source:

<https://www.theccd.ie/news?i=188>

We hope to be there next year!

Question

Can the Linux scheduler can take into account the thermal status of a processor?

- Green = Yes
- Red = No



Answer

- Green = Yes

As of kernel v5.7, there is a new “Thermal Pressure” API and thermal governors in the kernel, which can help shift processing from overheated CPUs.

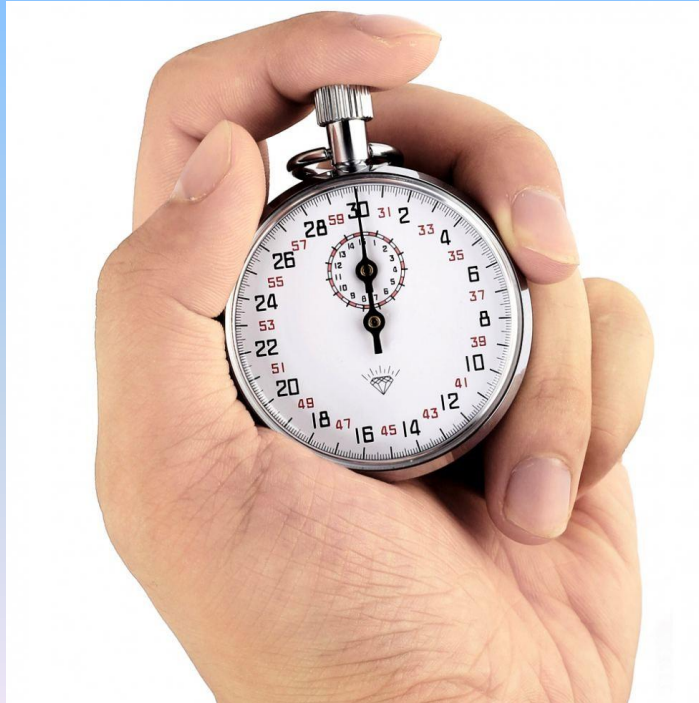
Source:

<http://lwn.net/Articles/788380>

Question

After 13 long years out-of-tree, the PREEMPT_RT patch set is now poised to be accepted into mainline. The initial kconfig entry has already been accepted.

- Green = True
- Red = False



Answer

- Green = True

The kconfig entry for PREEMPT_RT was added in the 5.3 kernel. See `kernel/Kconfig.preempt`.



Question

- Despite being bitten by a penguin, Linus Torvalds likes penguins.
 - Green = True
 - Red = False



Answer

- Green: True

Linus was bitten by a penguin in 1993 while in Australia for a speaking engagement. But he's OK with them now.

Source:

<https://fossbytes.com/why-is-the-penguin-tux-the-official-mascot-of-linux-because-torvalds-had-penguinitis/>



Question

Linux was first called:

- Green = Linus' Unix
- Red = Freax



Answer

- Red = Freax

Yeah. Really.

Source:

https://en.wikipedia.org/wiki/History_of_Linux

And to think, we could have had the “Embedded Freax Conference”

Question

Which of the following quotes did Rusty Russel have in his e-mail signature?

- Green = “There are those who do and those who hang on and you don't see too many doers quoting their contemporaries. -- Larry McVoy”
- Red = “Anyone who quotes me in their sig is an idiot. -- Rusty Russell”

Answer

- Red or Green!

Both answers are acceptable. Rusty has had both of these as his signatures at different times.

Question

The Linux Foundation has become the home to many open source projects. How many LF projects are there currently?

- Green = about 120
- Red = about 180



Answer

- Red = about 180

It's hard to count, since new projects are created regularly.

There are 177 projects listed here:

<https://www.linuxfoundation.org/projects/directory/>

and there are some I'm aware of that are not listed.

Question

On average, how many patches per hour were contributed to the Linux 5.7 release?

- Green = about 9
- Red = about 12



Answer

- Green = about 9

The actual patches-per-hour for 5.7 was: 9.2 per hour. This was a little less than the max of 9.7 for kernel version 4.9.

Source:

https://github.com/gregkh/kernel-history/blob/master/kernel_stats.ods

Question

A patch to add Syscall User Dispatch was accepted into the Linux kernel in version 5.8.

- Green = True
- Red = False



Answer

- Red = False

Syscall User Dispatch is a feature that allow a process to direct some syscalls to user-space, and it is useful for an OS compatibility layers, like WINE. A patch has been sent to LKML, but it has not been accepted into Linux mainline yet.

Source: <https://lkml.org/lkml/2020/9/4/1122>

Question

The year 2020 will be noted for the Coronavirus pandemic, fires, civil unrest, and economic hardship. What unexpected additional problem did 2020 have?

- Green = Plague
- Red = Locusts
- Red and Green = Both

Answer

- Red and Green = Both

The Bubonic plague was reported in China and California this year. And locusts swarmed in many countries in Africa.

Sources:

- <https://www.sciencealert.com/california-has-just-reported-a-case-of-human-plague>
- <https://www.bbc.com/future/article/20200806-the-biblical-east-african-locust-plagues-of-2020>

Game 1 over
Time for Game 2

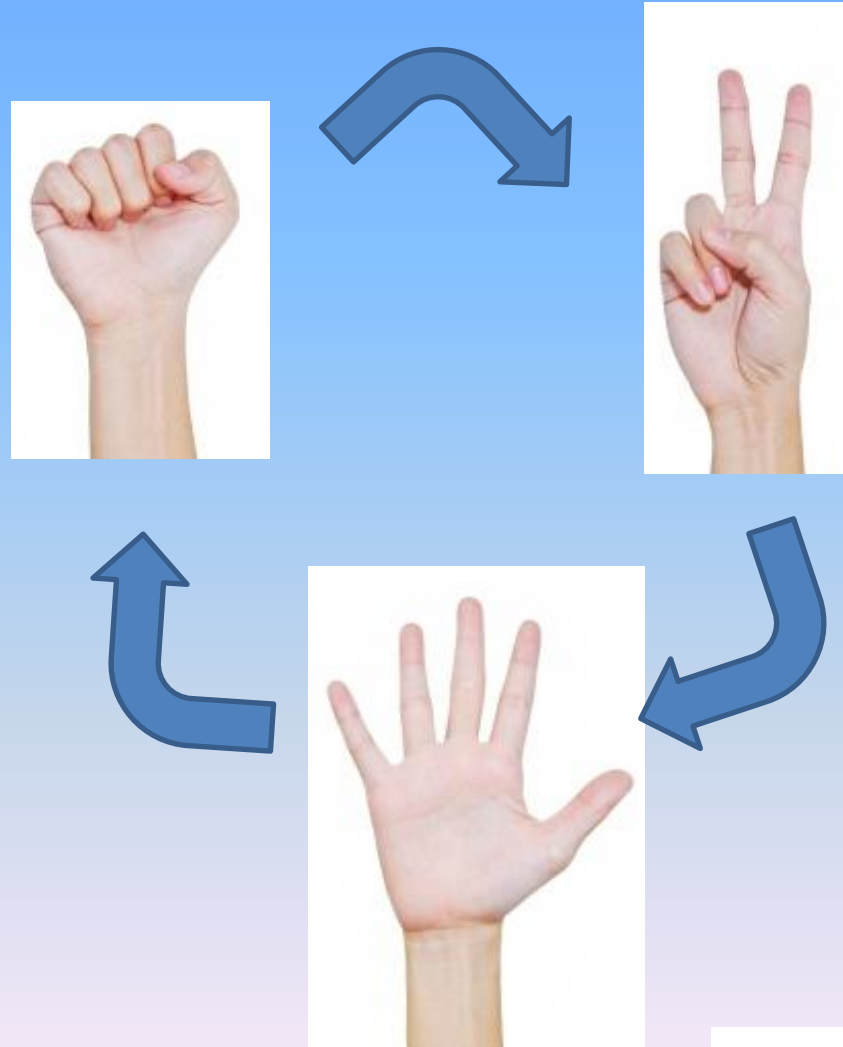
Our Second Game

- Rock, Paper, Scissors - against Tim's web script

Rules

- Rock beats scissors
- Scissors cuts paper
- Paper covers rock

If you beat the presenter
you stay in the game.



Let's begin

- Back to the web site!

<https://closinggame.net/rg>

Game 2 over
Time for some closing thoughts...

Recent Events

- It continues to be an interesting year...
- Lots of challenges
 - COVID19 restrictions have dragged on longer than expected
 - Seems to be lots of disagreement in the world

Observations

- Almost every religion and moral philosophy has the precept:
 - The “Golden Rule”
 - Do for others what you wish they would do for you
- A variation on this, which I think is even stronger:
 - Love your enemies
- With every challenging situation in life comes an opportunity:
 - Rise above it
 - Do more than expected

The Nature of Open Source

- Open Source is about a communal effort to make the world better
- Working together, we can build something
 - Not just useful
 - Something exceptional
- Recognize efforts of individuals and communities to build something that benefits others
- There are good things happening in the world!!

Making things better



Thanks for joining!

**Hope you learned something new,
and had a good time.**

Hope to see you in person next year!